

US-PAT-NO: 6553070

DOCUMENT-IDENTIFIER: US 6553070 B2

**TITLE:** Video-data encoder and recording media wherein a video-data encode program is recorded

----- KWIC -----

**Brief Summary Text - BSTX (25):**

Further, in an embodiment of the invention, where the encoding is performed according to the MPEG standard, the watermark data are embedded into one or some of macro-blocks determined referring to a criterion defined in connection with anyone of a slice, a picture, a field, a frame, or a GOP.

**Detailed Description Text - DETX (3):**

FIG. 1 is a block diagram illustrating a first embodiment of the invention, wherein a video-data encoder 100 according to the embodiment comprises; a DCT processor 101 for performing Discrete Cosine Transform of an original image data stream 110 wherein electronic watermark data 102 are to be embedded, a

Details Text Image HTML KWIC

2 US 6567534 B1

3 US 6563936 B2

4 US 6553070 B2

5 US 6530021 B1

6,246,802 B1 • 6/2001 Fujiwara et al. .... 382/276

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8 Claims, 5 D

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Frank Hartung et al, "digit  
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1996, pp. 205-213.

\* cited by examiner

Primary Examiner—Chris Ke  
Assistant Examiner—Allen W  
(74) Attorney, Agent, or Firm

(57)

ABST

To provide an apparatus for  
according to the frequency-d  
video data, a video-data enc  
forming encoding of an orig  
pressed data stream having  
prises; means (101) for trans  
into a sequence of processin  
data; means (102) for embed  
data into at least one unit o  
units; and means (104 and 1  
pressed data stream by proces  
ing units. Therefore, the data  
video data into the frequency  
water-mark data can be per  
additional process, by exploit  
encoding the original video t  
stream.

110

101

102

104

105

ORIGINAL

# TITLE Methods and systems for watermark processing of line art images

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## Brief Summary Text - BSTX (9):

Most of the prior art in image watermarking has focused on pixelated imagery (e.g. bit-mapped images, JPEG/MPEG imagery, VGA/SVGA display devices, etc.). In most watermarking techniques, the luminance or color values of component pixels are slightly changed to effect subliminal encoding of binary data through the image. (This encoding can be done directly in the pixel domain, or in another domain, such as the DCT domain.) In some systems, isolated pixels are changed in accordance with one or more bits of the binary data; in others, plural domain-related groupings of pixels (e.g. locally adjoining, or corresponding to a given DCT component) are so changed. In all cases, however, pixels have served as the ultimate carriers of the embedded data.

Details Text Image HTML KWIC

2 US 6567534 B1

3 US 6563936 B2

4 US 6553070 B2

5 US 6530021 B1

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6,081,345 A • 6/2000 Curry ..... 358/19  
6,086,706 A • 7/2000 Bressi et al. .... 156/277  
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104K 1/00  
0, 382/135  
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2, 287, 51,  
901, 902

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355/231

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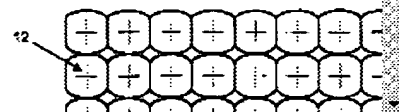
\* cited by examiner

*Primary Examiner*  
(74) Attorney, Age  
Digimarc Corporatio

(57)

Binary data is emb-  
lular recovery by, an  
encounter banknote  
scanners, and print  
providing nominal li  
virtual grid of point  
regions. The lumina  
changed to effect a  
nance may be cha  
spacing of the artwo  
the artwork.

8 Cls



## registration and calibration

----- KWIC -----

## Detail Description Paragraph - DETX (24):

[0048] Furthermore, the system of the present invention has means for a user interface for all phases of the invention. A user may select, among other things, which images are to be registered, and at what arbitrary image plane. The user interface, suitable for display on a computer monitor and with input from a keyboard, mouse pointer, or other I/O device, has fields for any and all internal and external parameters of the projection matrix of the images, including aspect ratio, number of rows of images, the tilt between rows, the angle between photos within a row, the roll of each image taken (e.g., landscape mode), as well as fields for how many horizontal rows of images are to be registered (typically two or more), image center position, focal length of camera, camera orientation with respect to a common reference frame, such as camera pan, tilt, roll and skew, and the brightness and contrast of images. The user interface may have the ability to adjust the aforementioned parameters for each image individually, or may have the ability to adjust parameters for images captured with a particular methodology, such as equal angular increments in latitude and longitude.

...specifies up to several levels of Gaussian pyramids. In a preferred embodiment, images taken from a plurality of cameras are registered with one another, and locally optimized objective function (local error) is used to construct a quadratic surface optimization function (global error) is used to avoid the direct evaluation of the objective function, saving computation. Concerning the blending aspect of the improved procedure is described that relates to Gaussian pyramids, using a blend mask determined by the Gaussian pyramid. The disclosed procedure is disclosed for the pyramid results in low frequency image blended over a wider region and high frequency image blended over a narrower region. Input is also provided to allow for initial calibration and feed-back photos and convergence of the system.

START:  
AD IN OVERLAPPING  
IMAGES I, J

SIZE PARAMETERS USED  
PAIRWISE OBJ. FUNC.

FIND LOWEST LEVEL IN  
GAUSSIAN PYRAMID

ESTIMATE AND ADJUST  
PARAMETERS OF PROJECTIVE  
REGISTRATION MATRIX  
 $m_{ij}$ ,  $b_{ij}$

325

324

9 US 20020145660 A1

10 US 20020114536 A1

11 US 20020113756 A1

12 US 20020105484 A1

DOCUMENT-IDENTIFIER: US 20030044073 A1

TITLE: Image recognition/reproduction method and apparatus

----- KWIC -----

## Summary of Invention Paragraph - BSTX (12):

[0010] Further, in order to obtain a more detailed three-dimensional model relating to the object of interest, there is a need for detection measurement as by a technique for obtaining the shape model image acquired by shape measuring means or by binocular stereo. As a result, computation costs are high and processing requires a period of time.



US 20030044073 A1

(51) United States

(52) Patent Application Publication (53) Pub. No.: US 2003/0044073 A1

Matsugu et al.

(54) Pub. Date

Mar. 6, 2003

(56) IMAGE RECOGNITION/REPRODUCTION METHOD AND APPARATUS

(57) Foreign Application Priority Data

Feb. 2, 1994 (JP) 1994-000000 1-010000  
Mar. 23, 1994 (JP) 1994-000000 1-010000(58) Inventors: Masaharu Matsugu, Chiba-ken (JP);  
Ritsuro Ito, Tokyo (JP)

Publication Classification

Correspondence Address:  
MORGAN & EVANS, LLP  
940 Park Avenue  
New York, NY 10166-0000 (US)(59) Int. Cl.<sup>7</sup> G06K 1/34; G06K 5/44;  
G06K 9/00; G06K 9/12  
(60) U.S. Cl. 382100; 382101; 382170

(61) Appl. No.: 10364402

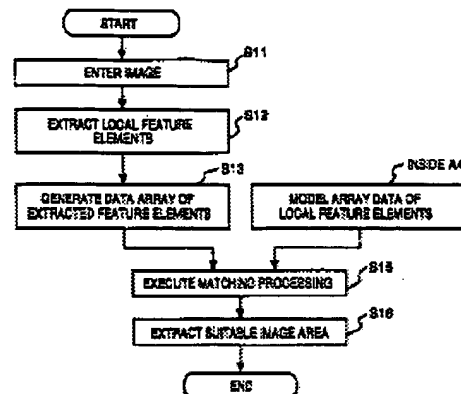
(62) ABSTRACT

(63) Filed: Oct. 1, 2003

Related U.S. Application Data

(64) Continuation of application No. 10/012,000, filed on Jul. 18, 2001, now Pat. No. 6,443,174, which is a continuation of application No. 09/543,717, filed on Feb. 2, 2000, now abandoned.

An image recognition/reproduction method includes an execution step of extracting local feature elements of an image and a selection step of selecting a pair composed of a prescribed local feature element and position information information thereof, this pair being data that the display represents a pair composed of a prescribed local feature element and position information information thereof and a pair composed of a local feature element extracted at the execution step and position information information thereof is less than a prescribed distance.



Details Text Images HTML KWIC

13 US 20030067462 A1

14 US 20030058240 A1

15 US 20030044073 A1

16 US 20030038801 A1

**DOCUMENT-IDENTIFIER: US 20020060686 A1**

**TITLE:** Texture information assignment method, object extraction method, three-dimensional model generating method, and apparatus thereof

----- KWIC -----

**Summary of Invention Paragraph - BSTX (9):**

[0007] According to this three-dimensional model construction apparatus, an object of interest that is rotated on a turntable is continuously shot by a camera. The silhouette image of the object of interest is extracted from the obtained image by an image processing computer. By measuring the horizontal distance from the contour of the silhouette image to the vertical axis of rotation for the silhouette image, a three-dimensional model is generated according to this horizontal distance and the angle of rotation. More specifically, the contour of the object of interest is extracted from the continuously shot silhouette images to be displayed as a three-dimensional model.

3 12, 1997 (JP)  
5 12, 1997 (JP)

**Publication Classification**

Int. CL.  
U.S. CL.

**ABSTRACT**

present method represents a three-dimensional by polygons according to a plurality of observation picked up by rotating a real object every angle to assign texture information on from object image information having the an area of the relevant polygon. In order to continuity between adjacent polygons, a information having correspondence between of interest and an adjacent polygon thereof is be the object image information approximating position and the shooting direction. And divides an object image into a plurality of difference between an object image and image in region level, outputs a mean value value of difference in the region level, region having the mean value of absolute value equal to or greater than a threshold portion. Another further method obtains a images by shooting only a background of interest and by shooting the object of interest. A silhouette image is generated by difference process between the object image and background image. A voting process is carried out on the basis of the silhouette image. A three-dimensional model is generated according to the three-dimensional shape voting process. The texture obtained from the object image is mapped to the polygon.

Details Text Image HTML KWIC

48 US 20020061123 A1

49 US 20020060686 A1

50 US 20020056120 A1

51 US 20020047835 A1

SILHOUETTE IMAGE PRODUCTION S12

VOTING PROCESS S14

POLYGON REPRODUCTION S16

US-PAT-NO: 6597406

DOCUMENT-IDENTIFIER: US 6597406 B2

TITLE: System for enhancing a video presentation of a live event

----- KWIC -----

## Detailed Description Text - DETX (102):

In the disclosed embodiment, cameras 60, 62 and 64 are each modeled as a 4.times.4 matrix which includes two parts—a fixed transformation (X) which represents the position of the camera in the stadium and its orientation, and a variable transformation (V) which varies with changes in pan angle, tilt angle and the zoom: ■

## Detailed Description Text - DETX (103):

The fixed transformation matrix (X) models x, y, z position as well as fixed yaw, pitch and roll representing the camera's mount orientation:

Details Text Image HTML KWIC

20 US 20010005218 A1

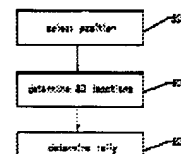
21 US 6597818 B2

22 US 6597406 B2

23 US 6549651 B2

598, 599, 600, 706; H04N 5/265, 5/272,  
5/268, 5/275

85 Claims, 25 Drawing



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Viz Software Documentation, 199

Primary Examiner—David E. Harvey  
Attorney, Agent, or Firm—Vian  
mon & DeNiro LLP

## ABSTRACT

Three-dimensional model is created  
to be captured on video. A camera  
and/or zoom sensors. An operator sel  
environment. The three-dimensional mo  
be the three-dimensional coordina  
ected by the operator. Information  
for zoom sensors is used to tr  
ensional coordinates to a two-dim  
video from the camera. Using t  
ition of the video, a graphic is p  
eo such that the graphic appears  
ation in the environment.

into a warped sequence of distinct and stationary scene changes each corresponding to a speaker slide, wherein each scene change is comprised of an associated subset of the image frames. A key frame is generated for each scene change representative of the associated subset. Each key frame is compared with the associated subset for identifying image frames with desired affordances such as semantically significant speaker gestures or pointing. The condensed version of the video is compiled as an annotated video comprising the key frames and the frames with the desired affordance. Redundant image frames and nuisance variations can be deleted from the video sequence so that the digest is a much more compact and concise version of the technical talk. Lastly, the condensed version is converted to a time or an audio for a useful representation of the talk.

#### Claims Text - CLTX (1):

1. A method for generating a condensed version of a video sequence for publication as an annotated video comprising steps of: storing the video sequence as a set of image frames; stabilizing the image frame sequence of distinct and stationary scene changes wherein each scene change is comprised of an associated subset of the image frames; generating a template image frame from the associated subset; filtering of the associated subset and matching the template in one of the associated subset, wherein the closest one comprises

U.S. Patent

May 6, 2003

Sheet 1 of 3

US 6,560,281 B1

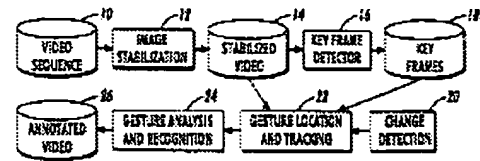


FIG. 1

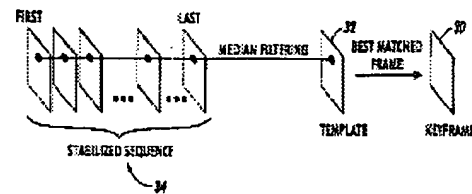


FIG. 2

Details Text Image HTML KWIC

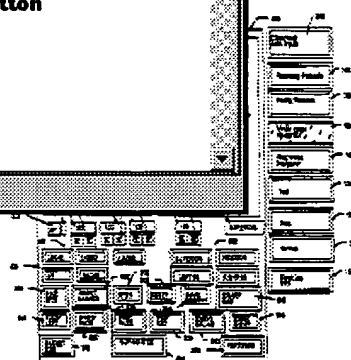
13 US 6560281 B1

14 US 6542773 B2

15 US 6452615 B1

16 US 6424989 B1

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| 15 | US 6452615 B1 |  |
| 16 | US 6424989 B1 |  |
| 17 | US 6389311 B1 |  |
| 18 | US 6385245 B1 |  |





(b) **Coarse-grained Matching.** A basic type of correspondence matching is illustrated by FIG. 7 which also

move routine may be used to insert a synthetic object into any video sequence based on the pose and geometric information and calculate all other required object views of the synthetic object remaining frames using the pose and geometric information and of the multi-view three dimensional estimation routine. As such object is inserted into the scene and appears as a "real" object in the imaged scene.

#### Claims Text - CLTX (11):

11. The apparatus of claim 9 further comprising: means for inserting a synthetic object into a frame of said video sequence where the geometry of said synthetic object is based on said computed object of said frame.

#### Claims Text - CLTX (12):

12. The apparatus of claim 11 further comprising: means for inserting a synthetic object in a plurality of frames in said video sequence sizing said placed synthetic object based upon said inserted frame.

Details Text Image HTML KWIC

14 US 6680976 B1

15 US 6600491 B1

16 US 6571024 B1

17 US 6553150 B1

18

United States Patent  
Sawhney et al.

Patent No. US 6,571,024 B1  
(4) Date of Patent: May 27, 2003

(50) METHOD AND APPARATUS FOR MULTI-VIEW THREE DIMENSIONAL ESTIMATION

(51) Inventors: Harpreet Singh Sawhney, Chubbuck, NJ (US); Robert Knepper, Morrisville, NC (US); V. Balasubramanian, Princeton, NJ (US); J. Peter A. DeRose, Princeton, NJ (US); K. Bhanu, Princeton, NJ (US)

(52) Assignee: Intel Corporation, Princeton, NJ (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended to adjusted under 35 U.S.C. 154(d) to 9 days.

(31) Appl. No.: 09/204,631

(32) Filed: Jan. 18, 1999

(33) Int. Cl. G06K 9/32; H04N 13/00  
(34) U.S. Cl. 382/294; 382/296; 382/298; 382/300; 382/302; 382/304; 382/306; 382/308; 382/310; 382/312; 382/314; 382/316; 382/318; 382/320; 382/322; 382/324; 382/326; 382/328; 382/330; 382/332; 382/334; 382/336; 382/338; 382/340; 382/342; 382/344; 382/346; 382/348; 382/350; 382/352; 382/354; 382/356; 382/358; 382/360; 382/362; 382/364; 382/366; 382/368; 382/370; 382/372; 382/374; 382/376; 382/378; 382/380; 382/382; 382/384; 382/386; 382/388; 382/390; 382/392; 382/394; 382/396; 382/398; 382/400; 382/402; 382/404; 382/406; 382/408; 382/410; 382/412; 382/414; 382/416; 382/418; 382/420; 382/422; 382/424; 382/426; 382/428; 382/430; 382/432; 382/434; 382/436; 382/438; 382/440; 382/442; 382/444; 382/446; 382/448; 382/450; 382/452; 382/454; 382/456; 382/458; 382/460; 382/462; 382/464; 382/466; 382/468; 382/470; 382/472; 382/474; 382/476; 382/478; 382/480; 382/482; 382/484; 382/486; 382/488; 382/490; 382/492; 382/494; 382/496; 382/498; 382/500; 382/502; 382/504; 382/506; 382/508; 382/510; 382/512; 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382/2566; 382/2568; 382/2570; 382/2572; 382/2

EAST Browser - L5: (39) 1 with 4 | US 6538688 B1 | Tag: S | Doc: 18/39 | Format : KWIC

File Edit View Tools Window Help

telecine process

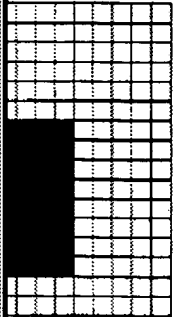
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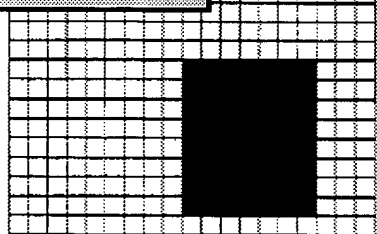
Detailed Description Text - DETX (13):  
A frame is composite if its odd and even fields contain pixel data from distinct images. This is the case for frame 400c of FIG. 4c. The even field of frame 400c contains the same pixel data as the even field of 400a. The odd field of frame 400c contains the same pixel data as the odd field of 400b. For this reason, frame 400c contains pixels data from two distinct images, the solid rectangle of frame 400a and the shifted, solid rectangle of FIG. 4b. Composite frames result when video sequence are transformed by a telecine process. Frame 400c is an intermediate frame that was inserted between frames 400a and frame 400b to adapt source video sequence 204 from a format having fewer frames per second (such as film) to a format having more frames per second (such as video). The telecine process creates frame 400c using the even field of frame 400a and the odd field of frame 400b. Since frames 400a and 400b include different images, frame 400c contains pixels data from two distinct images.

DetailsTextImageHTMLKWIC

|    |               |  |
|----|---------------|--|
| 16 | US 6571024 B1 |  |
| 17 | US 6553150 B1 |  |
| 18 | US 6538688 B1 |  |
| 19 | US 6507618 B1 |  |

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Examiner—Jessica J. Harrison  
 Examiner—Kerry Owens  
 Agent, or Firm—Burke-Robertson

### ABSTRACT

An interactive live action football game which for example on a television screen. A play live action football game is provided which on access storage and retrieval device, and a random, pre-recorded action football plays the role of players of opposite teams. This invention in random access storage and retrieval device according to type of play. The invention uses a microprocessor and microprocessor electronically associated with the random and retrieval device. The microprocessor is used to enable one or more users to select in the control device, different football plays in a type. A display device is electronically associated with the microprocessor to enable the selected play by the users. The microprocessor is further used to evaluate and accumulate play results as the users in a meaningful way. It is an object of the invention to provide an interactive, live game that can be played by one or more players or the like. It is a further object of the invention to provide such a television game which to select full motion video images, as opposed to graphics, to play such game and determine.

### 19 Claims, 7 Drawing Sheets

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    graph TD
      OD[OFFENSIVE DATABASE 32] --> VD[VIDEO DATABASE 34]
      DD[DEFENSIVE DATABASE 32] --> VD
      CL[COMMERCIAL LOGIC 37] --> FVS[FIRST VIDEO SEQUENCE 63]
      CD[COMMERCIAL DATABASE 38] --> FVS
      VD --> RAS[RANDOM ACCESS STORAGE OF VIDEO IMAGES 36]
      FVS --> RAS
  
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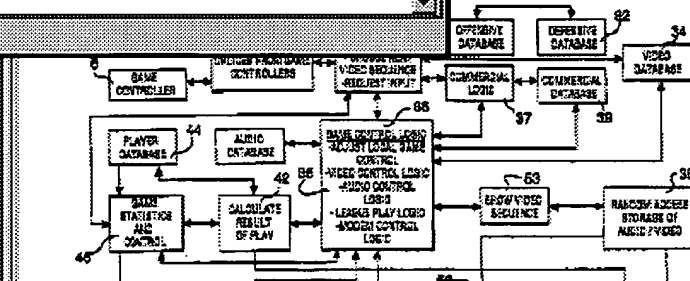
The replay portion of the video play sequence will always start after the ball has been taken out of play and no more new action pertinent to the game occurs. The replay portion of the play sequence will recap the current play while the players are entering their next game decisions. The replay will always continue to the end of the video play sequence. In this way, the final frame of every video play sequence will always be either in slow motion, a freeze frame or a graphics insert and thus provide a universal edit point back into the real time motion of the beginning of the next video play sequence and avoid visual or audible continuity problems with the edit. The end of the video play sequence will always edit to the next video play sequence with a wipe effect so that it psychologically brings the viewer back into real time without causing time disorientation.

## ABSTRACT

interactive live action football game which for example on a television screen. A player action football game is provided which includes access storage and retrieval device and a random, pre-recorded action football: plays (fiction of players of opposite teams). This information random access storage and retrieval device according to type of play. The invention uses a microprocessor and microprocessor electronically associated with the random and retrieval device. The microprocessor is used to enable one or more users to select in the control device, different football player's type. A display device is electronically connected to the microprocessor to enable the selected play by the user. The microprocessor is further used to evaluate and cumulate play results in the users in a meaningful way. It is an object of the invention to provide an interactive, live game that can be played by one or more players or the like. It is a further object of the invention to provide such a television game which to select full motion video images, as opposed to graphics, to play such game and determine

**19 Claims, 7 Drawing Sheets**

|    |              |  |
|----|--------------|--|
| 25 | US 6137912 A |  |
| 26 | US 5695401 A |  |
| 27 | US 5462275 A |  |
| 28 | US 4724491 A |  |



**TITLE** virtual objects insertion into video sequence

frames - detecting two frames with same feature and detecting point subset in other frames, to site virtual object in defined place in both frames, select object reference points, computing position and inserting object in each frame

----- KWIC -----

**Title - TIX (1):**  
Virtual objects insertion into video sequence of video frames two frames with same feature point set and detecting point subset in other frames, to site virtual object in defined place in both frames, select object reference points, computing position and inserting object

**Standard Title Terms - TTX (1):**  
VIRTUAL OBJECT INSERT VIDEO SEQUENCE VIDEO FRAME POINT SET DETECT POINT SUBSET FRAME SITE VIRTUAL OBJECT SELECT OBJECT REFERENCE POINT COMPUTATION POSITION

Details Text Image HTML KWIC

|    |                  |  |
|----|------------------|--|
| 34 | US 20030076334 A |  |
| 35 | US 6181382 B     |  |
| 36 | WO 9726758 A     |  |
| 37 | US 5481307 A     |  |

WO 9726758

PCT/GB97/00015

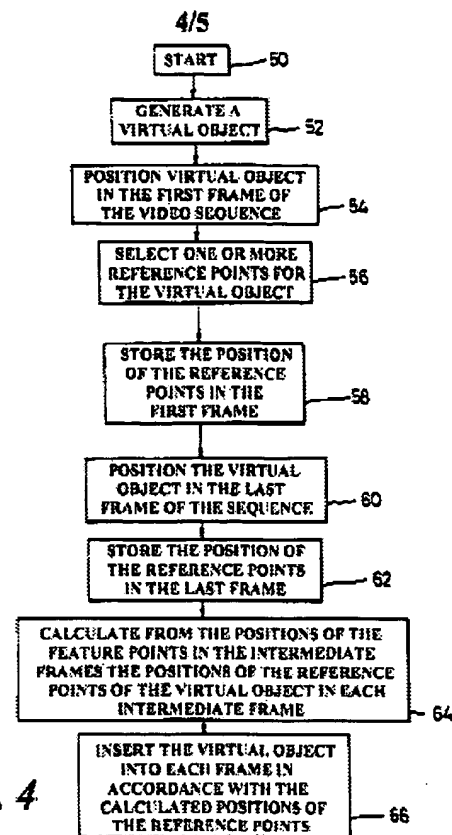


Fig. 4

SUBSTITUTE SHEET (RULE 26)

**TITLE** virtual objects insertion into video sequence of frames - detecting two frames with same feature and detecting point subset in other frames, to site virtual object in defined place in both frames, select object reference points, computing position and inserting object in each frame

----- KWIC ----- ■

**Title - TIX (1):**  
Virtual objects insertion into video sequence of video frames two frames with same feature point set and detecting point subset in other frames, to site virtual object in defined place in both frames, select object reference points, computing position and inserting object in each frame

**Standard Title Terms - TTX (1):**  
VIRTUAL OBJECT INSERT VIDEO SEQUENCE VIDEO FRAME POINT SET DETECT POINT SUBSET FRAME SITE VIRTUAL OBJECT SELECT OBJECT REFERENCE POINT COMPUTATION POSITION

Details Text Image HTML KWIC

|    |                  |  |
|----|------------------|--|
| 34 | US 20030076334 A |  |
| 35 | US 6181382 B     |  |
| 36 | WO 9726758 A     |  |
| 37 | US 5481307 A     |  |

WO 9726758

PCT/GB97/00003

3/5

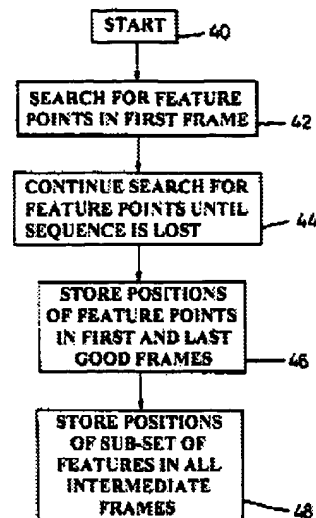


Fig. 3

SUBSTITUTE SHEET (RULE 26)

The invoice folder provides a method for producing a continuous view image containing a full background scene.

